

CLAIMS

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1. An inhaler for administering medicament by inhalation, comprising:
an inhalation channel (24);
a rotatable dosing unit (16) which includes at least one dosing element (18) for providing
a dose of medicament to the inhalation channel (24); and
a dose counting unit (42) which comprises an electronic display (57), an electrical circuit
for counting each dose of medicament provided to the inhalation channel (24) and
driving the display (57) so as to provide an indication as to the usage of the inhaler, the
electrical circuit including at least one switch which comprises a contact element and is
one of opened or closed when a dose of medicament is provided to the inhalation
channel (24), and a rotatable member (45) connected to the dosing unit (16) so as to be
rotatable therewith, the rotatable member (45) including at least one cam surface (51, 52)
which includes at least one cam (51a, 52a), each cam (51a, 52a) on each cam surface (51,
52) being configured, on rotation of the dosing unit (16) to provide a dose of medicament
to the inhalation channel (24), such as to cause movement of the contact element of the
respective at least one switch and one of open or close the same.
2. The inhaler of claim 1, wherein the electrical circuit includes a first switch which
comprises a first contact element and a second switch which comprises a second contact
element and the rotatable member (45) includes first and second cam surfaces (51, 52)
which each include at least one cam (51a, 52a) which is configured to cause movement
of a respective one of the first and second contact elements so as to one of open or close
the first and second switches.
3. The inhaler of claim 1 or 2, wherein the dosing unit (16) includes a plurality of dosing
elements (18) and each cam surface (51, 52) includes a plurality of cams (51a, 52a)
having the same angular spacing as the dosing elements (18) in the dosing unit (16).

4. The inhaler of claim 3, wherein the plurality of dosing elements (18) in the dosing unit (16) and the plurality of cams (51a, 52a) on each cam surface (51, 52) are angularly equispaced.

5. The inhaler of claim 2 ~~or claim 3 or 4 when appendant upon claim 2~~, wherein the corresponding cams (51a, 52a) on the first and second cam surfaces (51, 52) are rotationally offset in relation to one another such that one of the first and second switches is one of opened or closed before the other.

6. The inhaler of claim 5, wherein the cams (51a, 52a) on the first and second cam surfaces (51, 52) are rotationally offset such that, on rotation of the rotatable member (45), in a first phase of rotation one of the first and second switches is closed and the other of the first and second switches is open, in a second phase of rotation the first and second switches are closed, in a third phase of rotation the one of the first and second switches is open and the other of the first and second switches is closed and in a fourth phase of rotation the first and second switches are open, and the electrical circuit is configured to count only when this sequence of closing and opening the first and second switches is followed.

7. The inhaler of ~~any of claims 1 to 6~~ ^{claim 1}, wherein each contact element is a resiliently-biased arm (62, 63) which includes a first part which rides on the respective cam surface (51, 52) and a second part which provides a contact pad (62b, 63b).

8. The inhaler of claim 7, wherein the arm (62, 63) is resilient and configured such that the second part thereof which provides a contact pad (62b, 63b) moves at least partly laterally over a contact surface when the first part thereof rides onto and over a cam (51a, 52a).

9. The inhaler of claim 7 ~~or 8~~, wherein the arm (62, 63) includes a bend (62a, 63a), the outer surface of which rides on the respective cam surface (51, 52).

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claim 1
A 10. The inhaler of ~~any of claims 1 to 9~~, wherein the dosing unit (16) includes a shaft (20) which includes a surface provided with one of at least one of an external or internal spline (38) and the rotatable member (45) includes a surface provided with the other of at least one of an external or internal spline (54), the splines (38, 54) being engaged such that the dosing unit (16) and the rotatable member (45) in use rotate concomitantly.

claim 1
A 11. The inhaler of ~~any of claims 1 to 10~~, wherein the electrical circuit is configured to drive the display (57) to display the number of doses used.

claim 1
A 12. The inhaler of ~~any of claims 1 to 10~~, wherein the electrical circuit is configured to drive the display (57) to display the number of doses remaining.

13. The inhaler of claim 12, wherein the electrical circuit is configured to drive the display (57) to display intermittently the number of doses remaining when a predetermined number of doses or less are remaining.

claim 1
A 14. The inhaler of ~~any of claims 1 to 13~~, wherein the display (57) is a liquid crystal display.

claim 1
A 20 15. The inhaler of ~~any of claims 1 to 14~~, further comprising a rotatable grip portion (4) which is in use gripped by a user and when rotated in one sense rotates the dosing unit (16) to provide a dose of medicament to the inhalation channel (24).

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